

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
5 August 2004 (05.08.2004)

PCT

(10) International Publication Number
WO 2004/065497 A3

(51) International Patent Classification⁷: **C09D 5/08**

(21) International Application Number:
PCT/US2004/001143

(22) International Filing Date: 16 January 2004 (16.01.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/346,374 17 January 2003 (17.01.2003) US
60/452,843 7 March 2003 (07.03.2003) US

(71) Applicant (for all designated States except US): **UNIVERSITY OF MISSOURI CURATORS** [US/US]; Office of Technology & Special Projects, University of Missouri System, 475 McReynolds Hall, Columbia, MO 65211-2015 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **STOFFER, James, O.** [US/US]; 16 Laird Avenue, Rolla, MO 65401 (US). **O'KEEFE, Thomas, J.** [US/US]; 905 Southview Drive, Rolla, Missouri 65401 (US). **MORRIS, Eric** [US/US]; 40 Chardonay, Irvine, CA 92614 (US). **YU, Pu** [US/US]; 513 Tipton Court, Rolla, MO 65401 (US). **HAYES, Scott** [US/US]; 205 A Rhodes Avenue, Rolla, MO 65401 (US).

(74) Agents: **STEFFEY, Charles, E.** et al.; Schegwan, Lundberg, Woesner & Kluth, P., A., P.O. Box 2938, Minneapolis, MN 55402 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:
13 January 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CORROSION RESISTANT COATINGS CONTAINING RARE EARTH COMPOUNDS

(57) Abstract: A coating composition comprising an effective corrosion-inhibiting amount of a rare earth compound, a neutral to slightly acidic generating extender or an acidic generating extender, or combinations thereof is provided. In one embodiment, the corrosion-inhibiting components are combined with other components such as extenders, amino acids and amino acid derivatives, gelatin and gelatin derivatives, organic-based exchange resins, and combinations thereof, to enhance the corrosion resistance of the resultant coating film. The coating compositions have good adhesion to substrates such as metals, including aluminum and aluminum alloys.

WO 2004/065497 A3

INTERNATIONAL SEARCH REPORT

International Application No
/US2004/001143

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C09D5/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C09D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP 0 902 103 A (NIPPON STEEL CORP) 17 March 1999 (1999-03-17)</p> <p>paragraph [0006] paragraph [0008] paragraph [0014] paragraph [0017] paragraph [0023] - paragraph [0025] paragraph [0028] - paragraph [0030] paragraph [0052]</p> <p>----- -/--</p>	<p>1,2,7, 9-14,21, 25-28, 30, 41-43, 50,54, 60-62, 64,80, 82,84,89</p>

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

21 June 2004

Date of mailing of the international search report

22 OCT 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Matthijssen, J-J

INTERNATIONAL SEARCH REPORT

 International Application No
 /US2004/001143

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/31064 A (CHEMTEALL GMBH ; DOMES HERIBERT (DE); JUNG CHRISTIAN (DE); MAURUS NORB) 18 April 2002 (2002-04-18) page 41, line 1 - line 17 page 52, line 9 - line 13 table 2 claims 1,3,4,8,13,20,22,23,25,32,34,35,41,44,52,6 0	1,7, 10-13, 21,27, 28,30, 41-45, 50,54, 58-62, 76,87,89
X	----- EP 1 125 989 A (NIPPON PAINT CO LTD) 22 August 2001 (2001-08-22) paragraph [0006] paragraph [0008] paragraph [0010] paragraph [0013] paragraph [0055] - paragraph [0057] paragraph [0060] paragraph [0063] paragraph [0065] - paragraph [0066] -----	1,2,5,7, 9-15,21, 25-28, 30, 41-45, 50,54, 58-62, 64,76, 80-82, 84,85, 87,89

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2004/001143

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1,2,5,7,9-15,21,25-28,30,41-45,50,54,58-62,64,76,80-82,84,85...

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims:

1,2,5,7,9-15,21,25-28,30,41-45,50,54,
58-62,64,76,80-82,84,85,87,89

coating composition comprising a rare earth compound an
extender and a binder, a method of preparing and a method
coating a substrate with said composition

2. claims: 3,16-20,22-24

coating composition comprising a praseodymium (III) and/or
(IV) compound

3. claim: 4

coating composition comprising a rare earth mixed oxid

4. claims: 6,8,29,31-40,90

coating composition comprising an extender selectes from
calcium, strontium, barium, sulphate or phosphate containing
salt

5. claims: 46-49

coating composition comprising a rare earth compound and a
inorganic or composite binder

6. claim: 51

coating composition comprising a rare earth compound,
cyclodextrin, triflic acid and an ion exchange resin

7. claims: 52,53

coating composition comprising a rare earth compound and a
gelatin or its derivative

8. claims: 55-57

coating composition comprising a rare earth compound and a
specific amino acid or its derivative

9. claim: 63

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Composite substrate coated with a coating composition
comprising a rare earth compound

10. claims: 65,75,77-79,83,88

pretreated substrate coated with coating composition
comprising a rare earth compound

11. claim: 86

coating composition comprising a rare earth carbonate or
triflate

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

/US2004/001143

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0902103	A	17-03-1999	AU 716052 B2	17-02-2000
			AU 1558897 A	22-08-1997
			CA 2245741 A1	07-08-1997
			EP 0902103 A1	17-03-1999
			US 6190780 B1	20-02-2001
			CN 1213410 A ,B	07-04-1999
			WO 9728291 A1	07-08-1997
			TW 531567 B	11-05-2003

WO 0231064	A	18-04-2002	AU 9559301 A	22-04-2002
			AU 9560901 A	22-04-2002
			CA 2425246 A1	08-04-2003
			CA 2426081 A1	18-04-2002
			DE 10149148 A1	16-05-2002
			WO 0231063 A1	18-04-2002
			WO 0231064 A1	18-04-2002
			EP 1328589 A1	23-07-2003
			EP 1328590 A1	23-07-2003
			US 2004062873 A1	01-04-2004
			US 2004022950 A1	05-02-2004
			AU 1594002 A	22-04-2002
			AU 2056602 A	02-04-2002
			CA 2423137 A1	21-03-2003
			CA 2425403 A1	08-04-2003
			WO 0224344 A2	28-03-2002
			WO 0231065 A2	18-04-2002
			EP 1325089 A2	09-07-2003
			EP 1330499 A2	30-07-2003
			US 2004009300 A1	15-01-2004
			US 2003185990 A1	02-10-2003

EP 1125989	A	22-08-2001	JP 2001226640 A	21-08-2001
			CA 2337370 A1	16-08-2001
			EP 1125989 A1	22-08-2001
			US 2001041757 A1	15-11-2001
